# *A50rack user´s guide*
# Amplification Racks for *aero 50* systems

Introduction
Presets
Array correction
Configurations
Accessories
Ease Focus simulations

Keep these instructions. Read them carefully.
Heed all warnings. Follow all instructions.

The exclamation point within an equilateral triangle is intended to alert the user of important operating and maintenance instructions in the literature accompanying the appliance.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product´s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Do not use this apparatus near water.

Do not expose this devices to rain or moisture.

Do not place any objects containing liquids such a bottles or glasses on top of the unit.

Clean only with a dry cloth.

Class I device.

A50racks require Class 2 ouput wiring.

Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus that produce heat.

Do not block ventilation openings. Install in accordance with the manufacturer´s instructions.

Take into account that the nominal AC voltage is the value shown in the equipment +-10% (according to IEC60065:2001).

Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles and the point where they exit from the apparatus.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.

TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE TOP OR BOTTOM COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER TO SERVICING TO QUALIFIED SERVICE PERNSONNEL.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRONIC SHOCK DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL RAMAIN READLY ACCESSIBLE.

TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE.

In order to avoid noise or hum, and protect the input/output stage of the systems electronics from serious damage, proper grounding connections of all the components of the system are required. Connect the components making sure that AC line polarity is maintained, and that all grounds are connected to a common grounding point using the same gauge cable as the neutral and line cables.

D.A.S. recommends that before powering up any D.A.S. system, test the mains making sure that the voltage potential difference between the neutral and ground does not exceed 5 VAC.

# Introduction

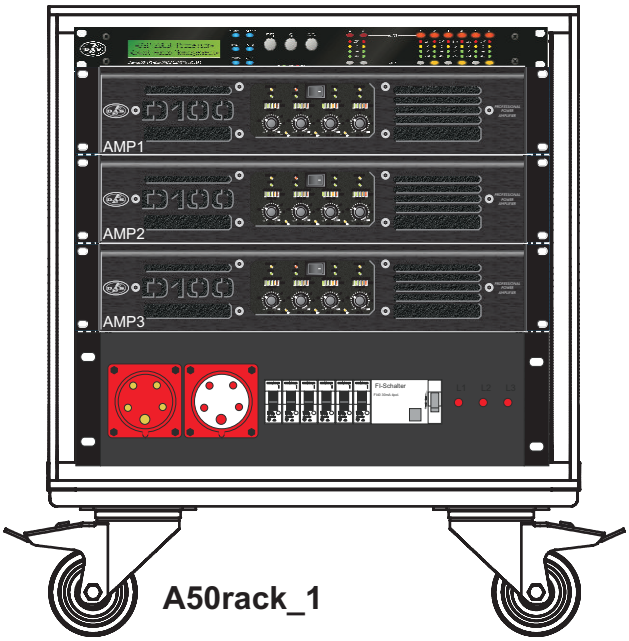
The A50rack is a rugged touring rack that includes power amplifiers, processors, power distro, input patch panel and output patch panel for the aero 50 line array systems.

There are two different options for the A50rack. Option1 (**A50rack_1**) is assembled with 3 x DAS Audio D-100 four channel amps and a DAS Audio DSP-2060A.
The D-100 amplifier is a 4 channel class D switching power supply amplifier of 2800W per channel.

In Rack Option 2 (**A50rack_2**) comprised by 6 x PowerSoft K-6DSP AESOP amplifiers.
The K-6 DSP includes its own DSP and is a class D switching power supply 2 channel amp. Power per channel is 3600W@2ohm.

Input patch panels have 2 or 3 (depending on the option) input connectors to create separated zones in the array.

In rack option 1 the output panel of the rack is always composed of three Speakon NL 8 connectors which will power up to two aero 50 each one working at 4ohm and up to 4 aero 50 (2ohm load) in the powersoft case, in rack option 2.




**A50rack_1**

The *aero 50* is a three way large format line array system to be used for live sound applications.

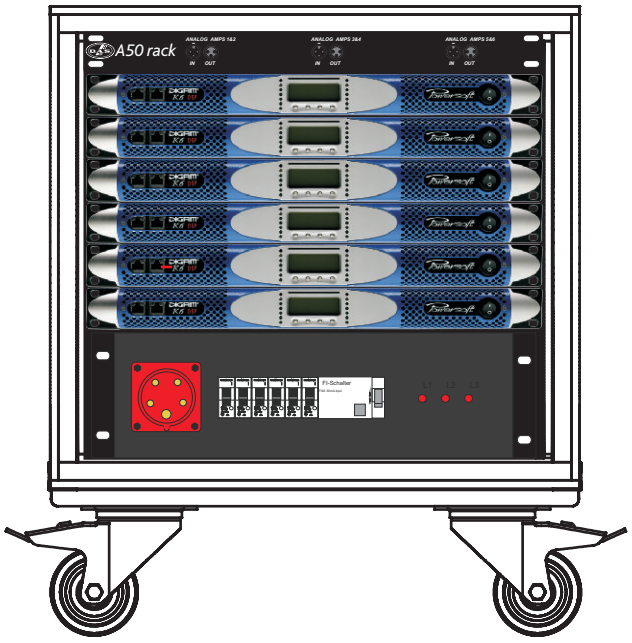
Two 15” loudspeakers with neodymium magnet assemblies reproduce the Low Frequency range.
Four 8” loudspeakers with neodymium magnet assemblies reproduce the Mid Frequency range.
Two 3” coil neodymium compression drivers with 1.5” exit reproduce the High Frequency range.

The system has been designed to have a nominal Horizontal coverage of 90º. In the coupling plane (vertical) the coverage depends on the frequency and the splay angles between cabinets, as it is a true line array system.
To ensure the performance of the system and the uniformity of the horizontal and vertical dispersion X-over points must not be changed.

A family of locked presets is provided for different DSP platforms; DAS DSP-2060A and 4080 and Lake LM-26 / PLM / K-6 amplifiers.

DAS Audio offers racks with amplifiers and processors. The processors in the racks adjust the levels between the ways (LF, MF, HF), the crossover points, delays and Eqs. These settings must remain without any variation to ensure the optimal acoustical performance of the system. (this is the main reason why they are locked).
Besides basic parametres, inside the processors clip and rms limiters are set up.

The system´s reliability and dynamic range are determined by the rms and clip limiter thresholds. Don´t vary them.




**A50rack_2**

## The presets

The family of presets available for the three main different platforms (DAS DSP-2060A/4080, PowerSoft K-6, Lake Lm26 / PLM) is based on a flat frequency response of a single *aero 50* cabinet. For updates check the DAS Audio website (aero 50 related downloads).

***www.dasaudio.com/en/p/aero-50-2/***

For DAS DSP-2060A and 4080 the presets are available in AudioCore .xaa format.

***http://www.dasaudio.com/DOCUMENTOS_D/SOFTWARE/AUDIOCORE_V871.ZIP***

For the Powersoft K-6 DSP amplifiers presets are available in Armonia format.

***http://www.powersoft-audio.com/en/support/armonia-support-forum.html***

For the Lake LM26 /PLM amplifiers, presets are available in .csm lake format.

***http://labgruppen.com/support/software_firmware/***

Different High Pass X-overs for the LF are provided; (a) 45Hz to be used as a full range system without subs, and (b) with cut at 80Hz to be used with LX-218C (or CA) subs.

Besides the High Pass X-overs presets are available for long (LT), mid (MT)and short throw (ST) zones in the array. To achieve a uniform sound pressure level across the distance and optimal acoustical performance a line array system has to be managed in groups of cabinets with different presets. For instance the four bottom cabinets should have to be treated as the downfill or short throw of the system.

There will be two different types of presets:

**Type A**: presets to be used in the rack processors to define all the settings in one cabinet.
Presets for all these platforms: DSP-2060A, LM26 and K6DSP.
Presets will be named as follows:

A50Vx.y LT
A50Vx.y MT
A50Vx.y ST

For instance: A50V5.4 ST

preset version — Long, Mid or Short Throw

**Type B:** to be used at the FOH DSP-4080 processor. The preset will compensate the array effect and the number of cabinets used.
These presets will be named as follows:
A50Vx.y 8U
A50Vx.y 10U
A50Vx.y 12U

For instance: A50V52 16U

preset version — Number of Units

# The Rack presets - type A

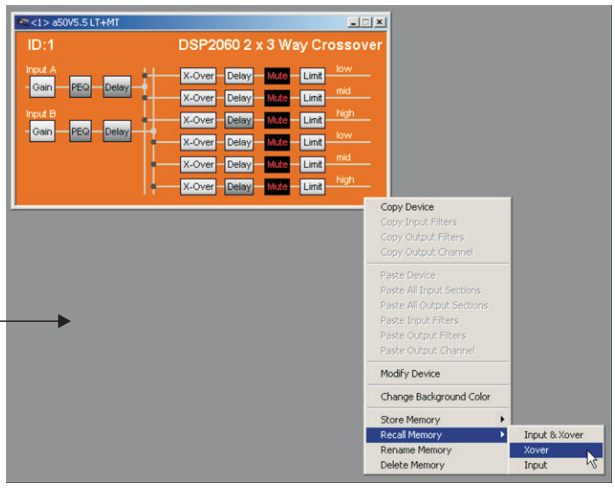
## *DAS DSP-2060A*

Presets(loaded in the processors) will be named as follows:
A50Vxy LT+MT (input A for LT, input B for MT)
A50Vxy MT+MT
A50Vxy MT+ST
A50Vxy LT+ST

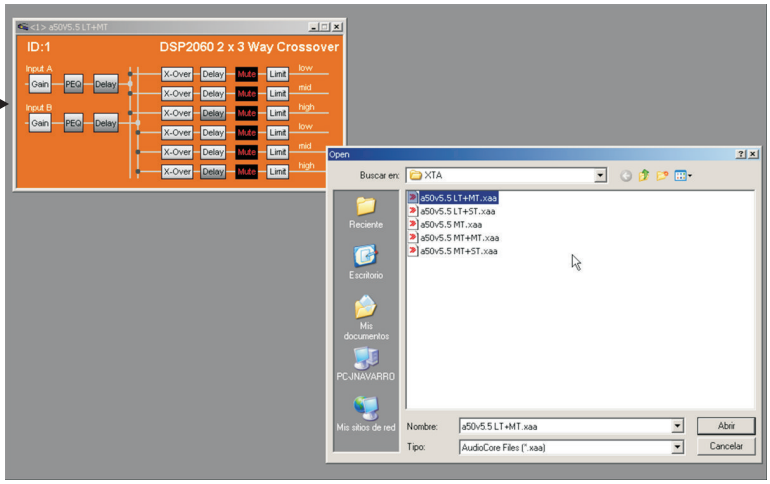
- To recall a memory or a preset using the front panel:
press menu -->enter--> global memory-->enter-->recall a memory-->enter-->Crossover-->enter and select the desired one.

All the previous listed presets or memories on the DSP-2060A are X-over type.

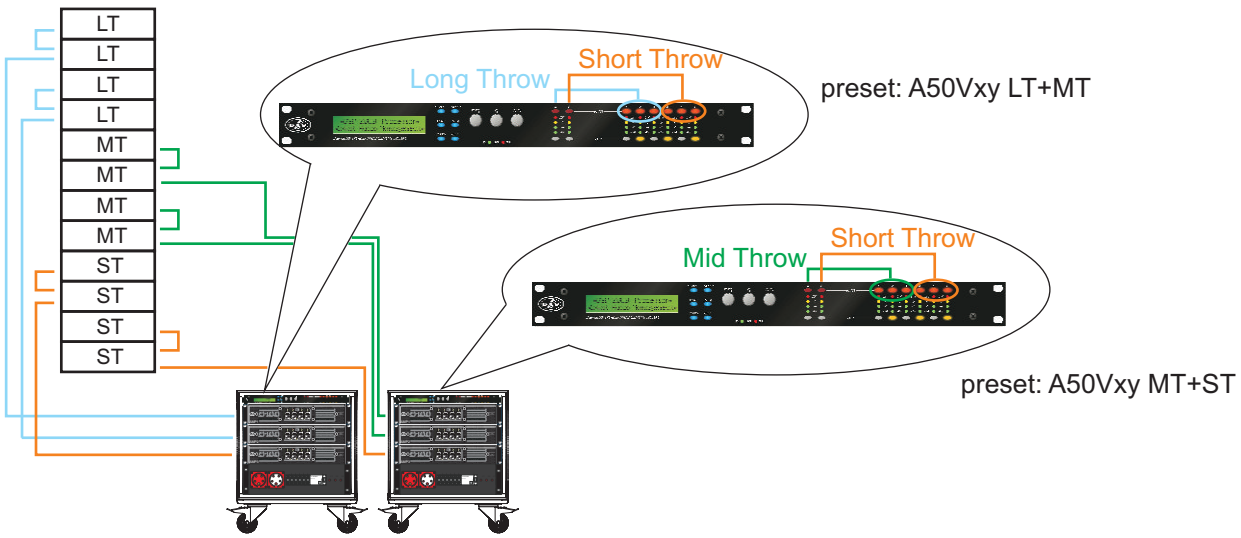
- When the DSP is connected to a computer using AudioCore software, to recall a memory (once the communication between DSP and computer has been stablished) just do right click on the DSP main window:




- When the DSP is connected to the computer but is not including factory presets just connect the unit to the computer and open the desired audioCore file. For example open A50V55 LT+MT.xaa
Next step, click On Line and send Settings to the unit. Once the unit (DSP) has the preset loaded the user can store it via software or via front panel.



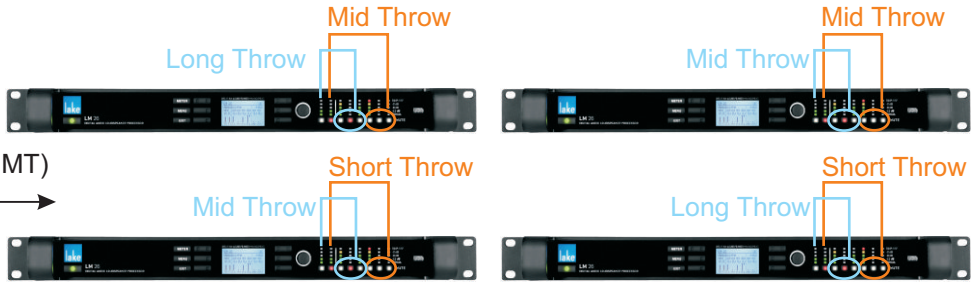

Example: a system with 12 aero 50 per side with 3 different signal groups would be configured as follows:



***LM-26*** Modules will be named as follows:

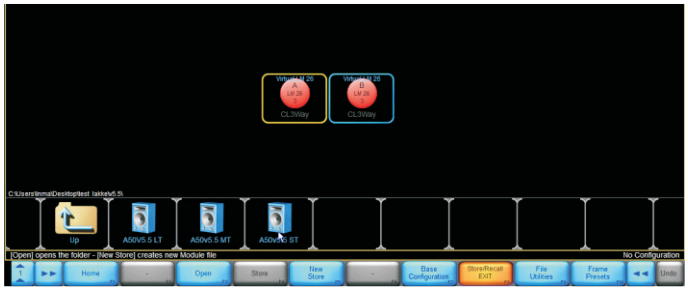
A50Vx.y LT
A50Vx.y MT
A50Vx.y ST

Frame presets will be named as:
A50Vx.y LT-MT (in A for LT, in B for MT)
A50Vx.y MT-MT
A50Vx.y MT-ST
A50Vx.y LT-ST

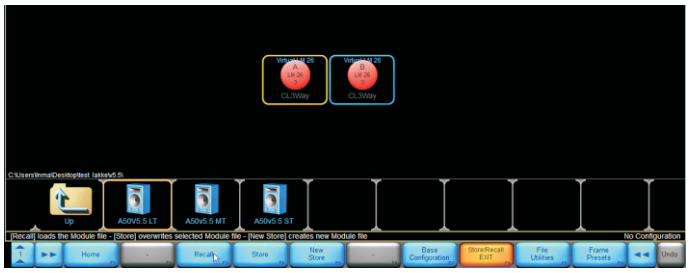


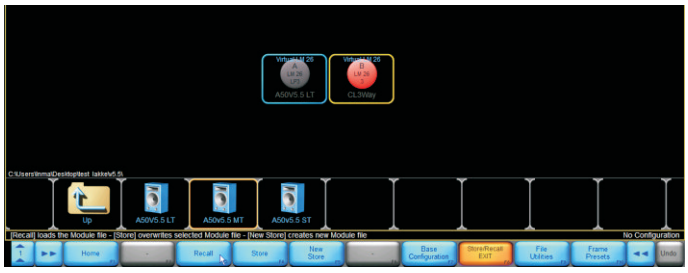

- To recall a frame preset using the front panel  go to menu--> enter--> frame preset --> enter --> select the memory A50x.y MT-ST -->recall

- To load a module (csm format) in the DSP using the Lake Controller software:



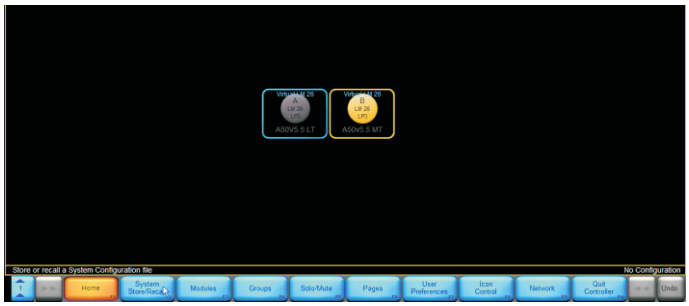
Go to Module Menu--> select recall a module

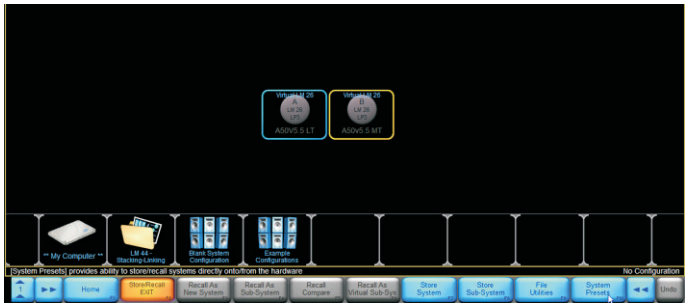




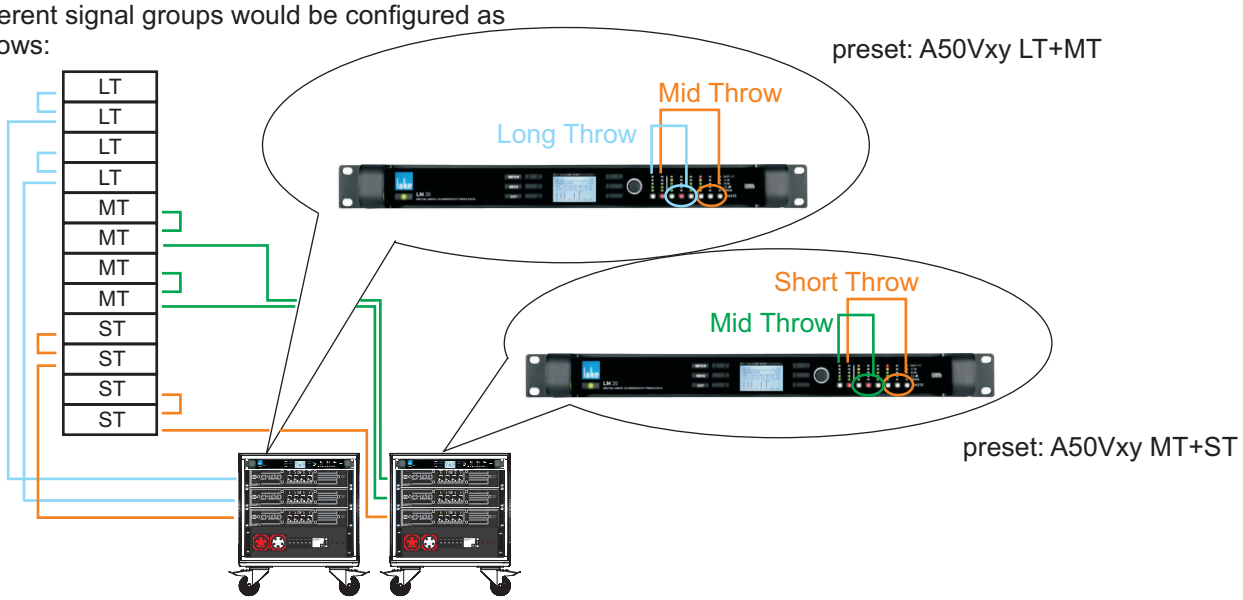
Select the desired module on module A (LT/MT/ST)--> recall --> Repeat the same procedure on Module B

- Once the two modules have been recalled (in this case LT and MT) the user should store them in the processor as system presets. To do it go to System Store / Recall folder --> System presets --> tap on both modules--> store with new name: A50V5.5 LT -MT





Example: a system with 12 aero 50 per side with 3 different signal groups would be configured as follows:

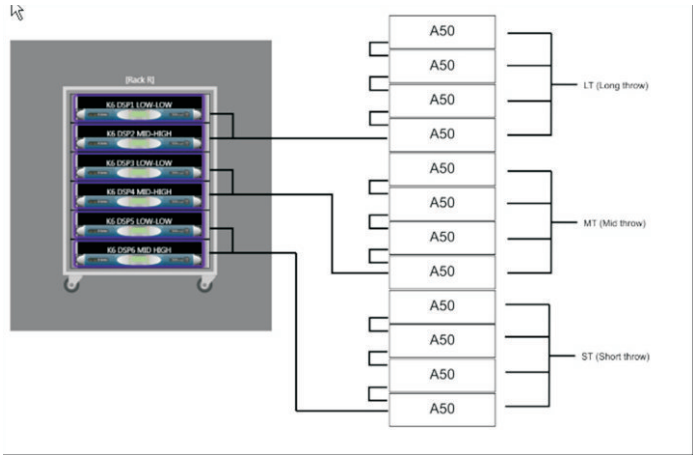


***K-6 DSP*** amplifiers, presets will be named as follows:

A50Vx.y Low -Low
A50Vx.y Mid-High MT
A50Vx.y Mid-High LT
A50Vx.y Mid-High ST

Due to the configuration of the power supply of the amps, Powersoft warns that both output channels must have a close to identical charge at output stage, since unbalanced charge will cause problems of excessive temperature rise. We recommend to follow next arrangement to the amplifier racks and cabling.

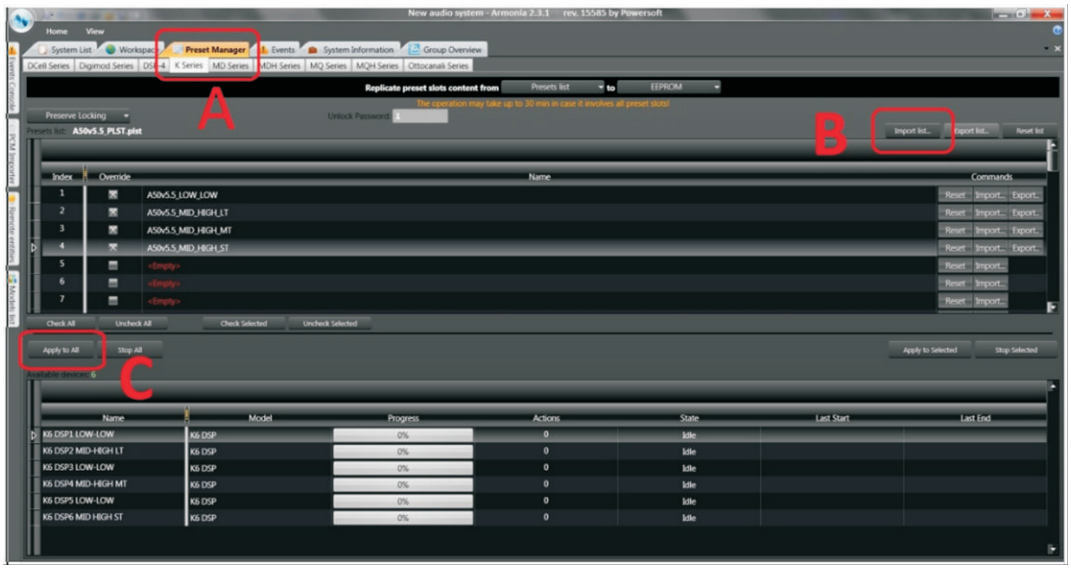
Each pack of 2 K6 DSP (LOW-LOW-MID-HIGH) is able to manage up to 4 Aero50 creating a 2 Ohm load configuration.



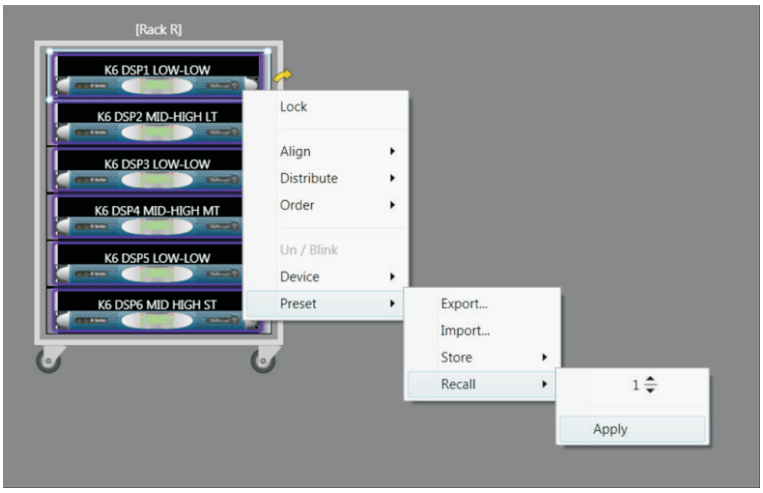

Since Armonía version 2.3.1, we are able to upload a preset directly from the software by right clicking on the desired amp. This could be faster but it will not save the preset into the DSP memories.

In order to be able of changing between different types of throws provided by DAS Aero50v5.5 Presets, we recommend the use of the **PRESET MANAGER** tab in armonía **(A)**, using the PLST file **(B)** you can “broadcast” the whole preset family for all connected amps by one single click **(C).**

**WARNING:** Make sure you have muted or unplugged the whole system speakers before doing this, since after spreading all presets the amps will take number 1 to use, being this one the LOW-LOW this can cause serious damage to high drivers.

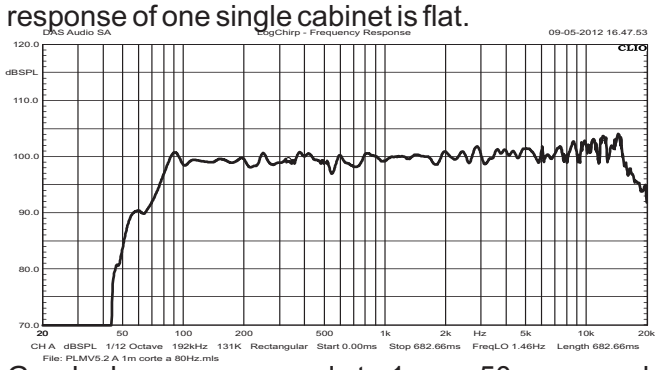


After armonía loads all presets (this can take a while) you can load the desired preset on each amplifier by doing right click on it and selecting from “Preset-->Recall” or either disconnect from the Net, and recall desired preset form the front panel of each Amplifier by “Local Presets” menu.

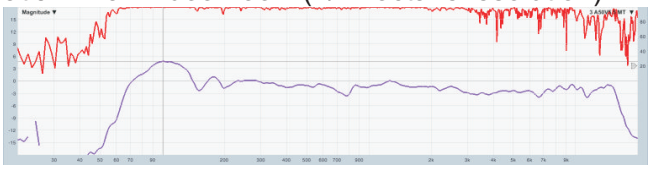


## The array correction

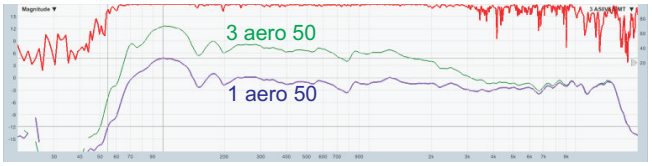
With the DSP presets provided the frequency response of one single cabinet is flat.



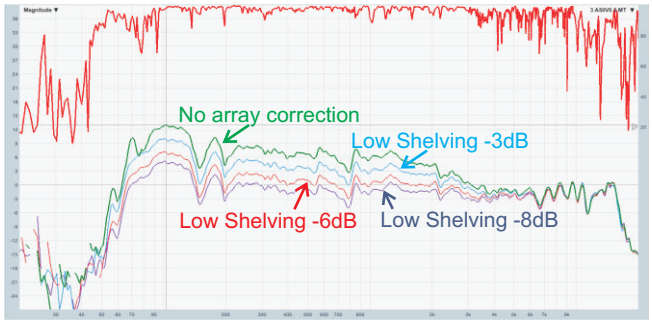

Graph shown corresponds to 1 aero 50 measured at 3m in an indoor room (1/12 octave resolution):



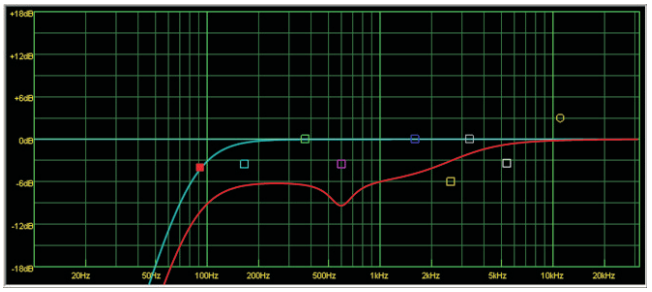
When coupling or adding more systems the low and mid ranges couple much more than the high frequency one. See the the graph below ( 1 aero 50 vs 3 aero 50):




The use of a DSP-4080 at FOH is mandatory to correct this effect (low an mid range coupling) and to have different sends to the PA (long throw, mid throw, short throw) or to other systems (Ffill, subs etc) as well as to properly time align all of them.
In the graph shown below different array corrections for different number of aero 50 cabinets (1/24 octave resolution).




Low Shelving filters with different gain values.
See below the electrical curve of the array correction on the processor for 12 aero 50 units:




**Type B presets:** to be used at the FOH DSP-4080

The preset will correct the array effect and the number of cabinets used.
These presets will be named as follows:
A50Vx.y 8U
A50Vx.y 10U
A50Vx.y 12U

For instance: A50V52 16U

preset version — Number of Units

## The array correction

| DSP | Number of units | EQs |
|---|---|---|
| DSP-2060A / 4080 | | |
| | 16 units | f =2k57Hz Q=0.59 Gain -8.5dB Low Shelf |
| | | f =595Hz Q=20 Gain -3dB Bell |
| | 14 units | f =2k57Hz Q=0.59 Gain -7dB Low Shelf |
| | | f =595Hz Q=20 Gain -3dB Bell |
| | 12 units | f =2k57Hz Q=0.59 Gain -6dB Low Shelf |
| | | f =595Hz Q=20 Gain -3dB Bell |
| | 10 units | f =2k57Hz Q=0.59 Gain -4.4dB Low Shelf |
| | | f =595Hz Q=20 Gain -3dB Bell |
| | 8 units | f =2k57Hz Q=0.59 Gain -2.5dB Low Shelf |
| | | f =595Hz Q=20 Gain -3dB Bell |

# A50rack_1: 6 x aero50 at 4 ohms

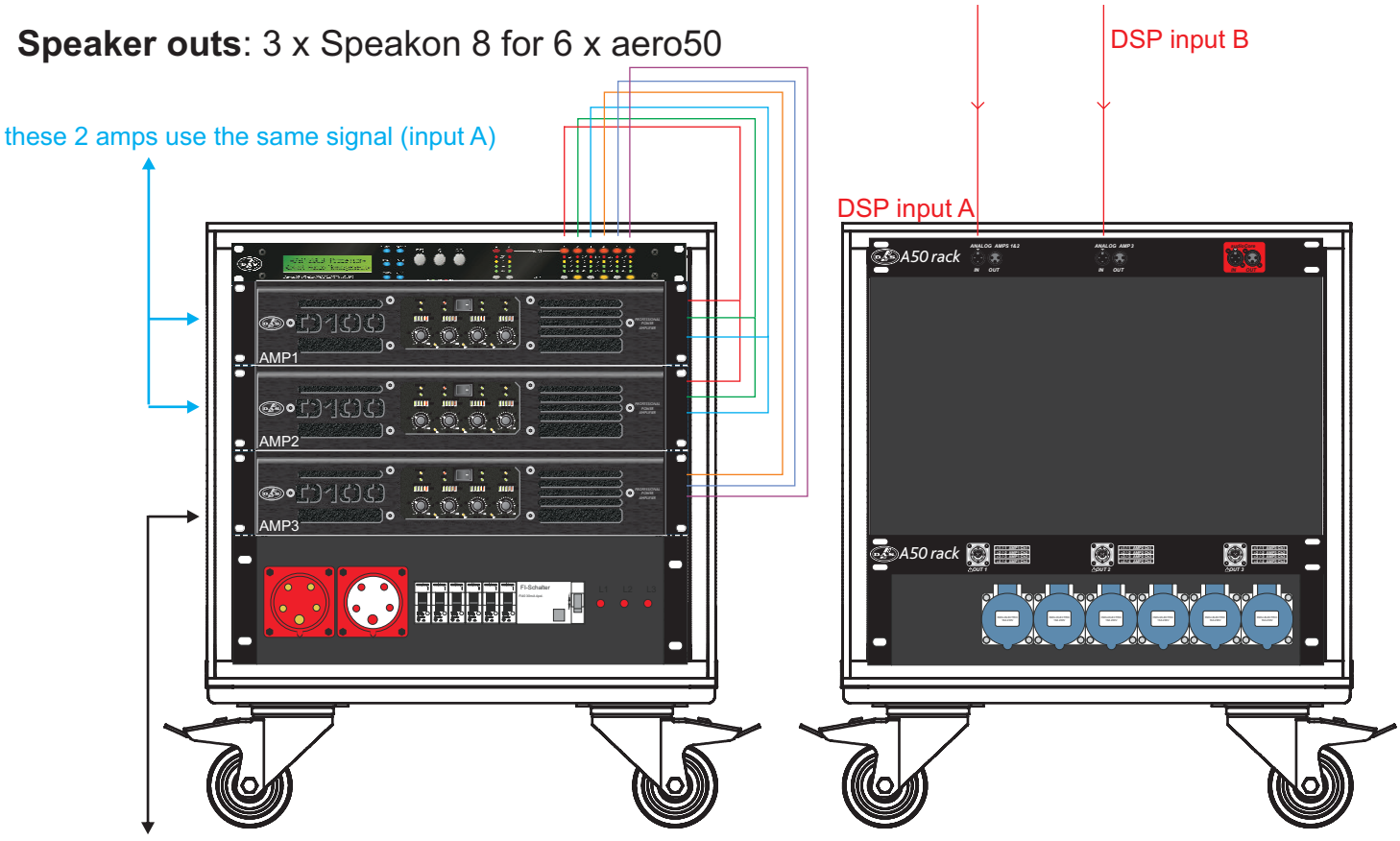
**AMPLIFIERS: DAS D-100 or FP10000Q rack (10U rack)**

**Each rack includes:** 1 x DSP-2060A + 3 x D100 (or 3 x FP10000Q) +
1 x power distro 32A in/out
2 independent input signals
Rs485 in/out to be used with audioCore.

**Amplifier Gain:** 36dB; for DAS D series
**Peak limiters D100**: LF 0dB, MF 0dB, HF -2dB

**Amplifier Gain:** 35dB; for FP series from LABGruppen
**Peak limiters FP10000Q**: LF 121V, MF 121V, HF 101V

**Speaker outs**: 3 x Speakon 8 for 6 x aero50




Presets available on the DSP-2060A:
A50Vxy LT+MT
A50Vxy MT+MT
A50Vxy MT+ST
A50Vxy LT+ST

# *Sample: 12 aero 50 + 12 LX-218C*

MIXER_1

MIXER_2

Presets to be used:

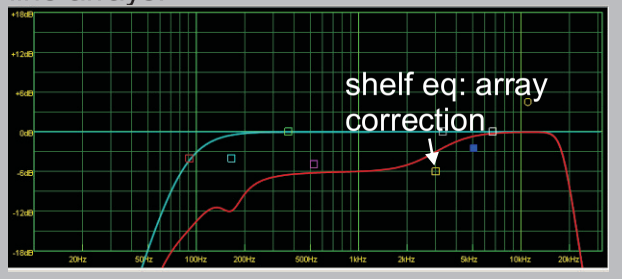
At the FOH DSP-4080 processor use A50Vx.y 12U
At the amplifier´s processors use A50Vx.y LT for long throw;
A50x.y.z MT for mid throw and A50x.y ST for short throw

LONG THROW
LONG THROW
LONG THROW
LONG THROW
MID THROW
MID THROW
MID THROW
MID THROW
SHORT THROW
SHORT THROW
SHORT THROW
SHORT THROW

FOH DSP4080

**B** presets: A50x.y 12U

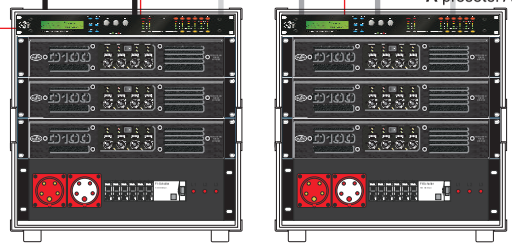
DSP to send different signals per groups and correct the low / mid coupling of the line arrays:



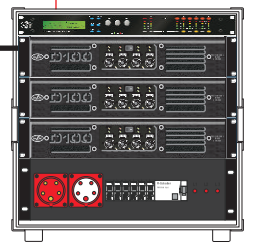

SUBS

**A** presets: A50Vx.y LT-ST

**A** presets: A50Vx.y MT-ST



SUB
SUB
SUB
SUB



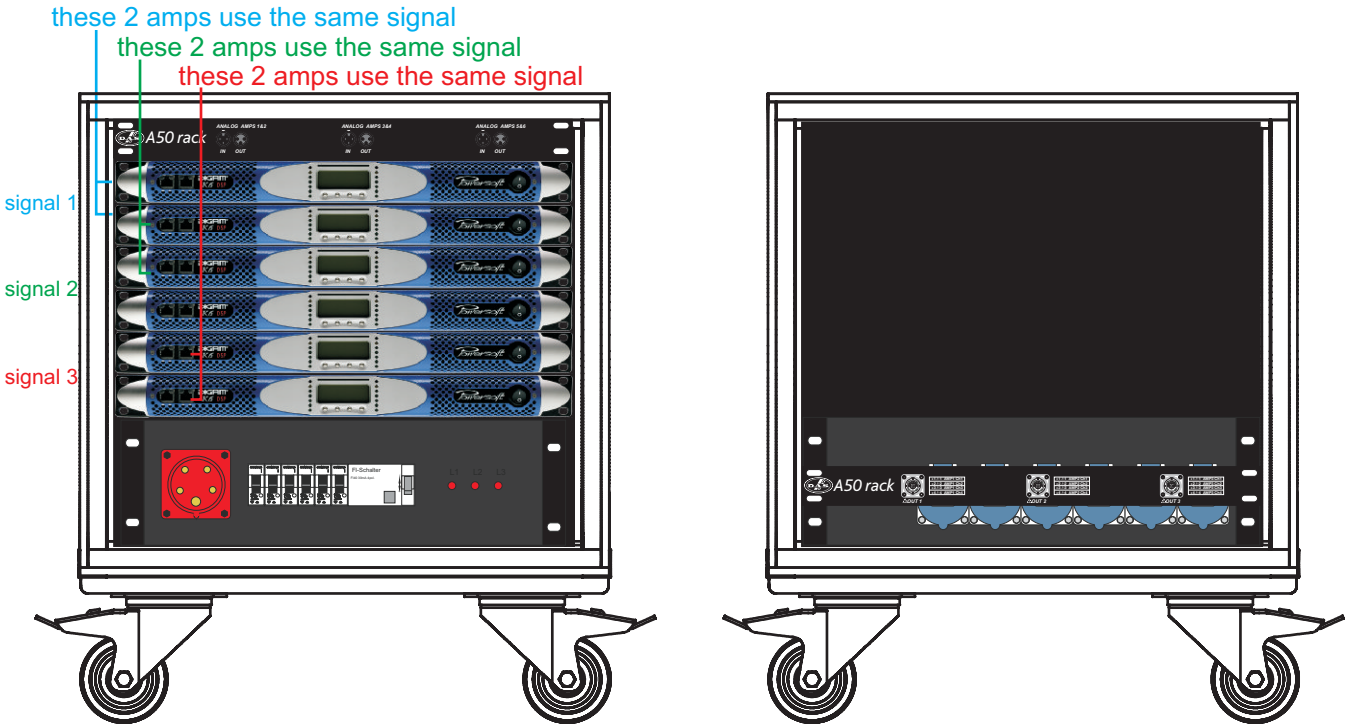
# A50rack_2: 12 x aero50 at 2 ohms

**AMPLIFIERS: Powersoft K-6DSP AES (10U rack)**

**Each rack includes:** 6 x K-6DSP+AESOP (DSP included in the amplifiers) +
1 x power distro 32A in
3 independent input signals

**Speaker outs**: 3 x Speakon 8 for 12 x aero50

**Remote monitoring** with Armonía Software (CAT5 cable)



# Sample: 12 aero 50 + 12 LX-218C

Presets to be used:

At the FOH DSP-4080 processor use A50Vx.y 12U
At the amplifier´s processors use A50Vx.y LT for long throw;
A50x.y.z MT for mid throw and A50x.y ST for short throw

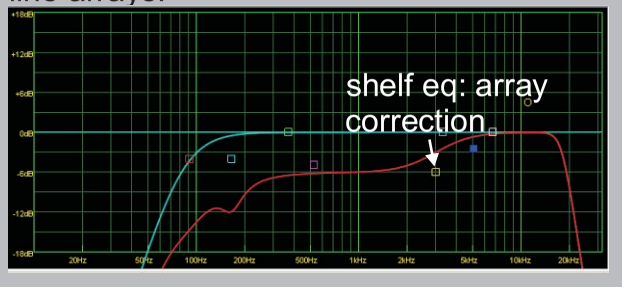
MIXER_1

MIXER_2

FOH DSP4080

**B** presets: A50Vx.y 12U

DSP to send different signals per groups and correct the low / mid coupling of the line arrays:




A50Vx.y Low-Low
A50Vx.y Mid-High LT

A50Vx.y Low-Low
A50Vx.y Mid-High MT

A50Vx.y Low-Low
A50Vx.y Mid-High ST

LONG THROW
LONG THROW
LONG THROW
LONG THROW
MID THROW
MID THROW
MID THROW
MID THROW
SHORT THROW
SHORT THROW
SHORT THROW
SHORT THROW

SUBS

| | | | | | |
|---|---|---|---|---|---|
| SUB | | | | | SUB |
| | SUB | | | | |

# Accessories

## Speaker cabling

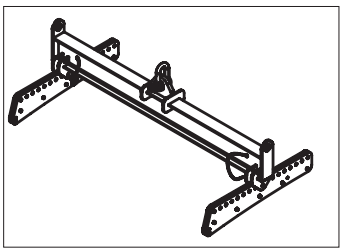
**SpkC1** (4 pair 2.5mm2 Speaker cable, 2 x NL8, 1m length)

**SpkC20** (pair 2.5mm2 Speaker cable, 2 x NL8, 20m length)

**SpkC25** (4 pair 2.5mm2 Speaker cable, 2 x NL8, 25m length)

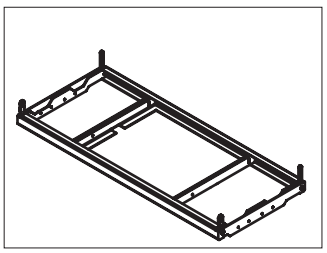
Note: 25m length valid for 12 to 16 *aero 50* per side
20m length valid for 8 to 10 *aero 50* per side

## Rigging frames

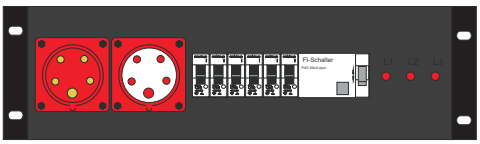


**AX-aero50** (one pick up bar + 2 moving side panels)
Weight: 51kg (112.2 lb)
Up to 8 cabinets
For more than 8 cabinets an additional pick up bar must be used

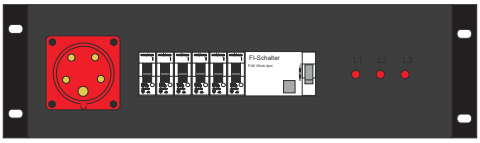
**AX-combo12** suspend *aero 12A* underneath *aero 50*
Weight: 19.6kg (43 lb)



## 19" Power Distros



**A50_ Distro1** (32A 400V 5P in / out + circuit breakers + LED per phase+ 6 x 16A Schuko)
To be used in racks type 1: D-100 or FP-10000Q amps



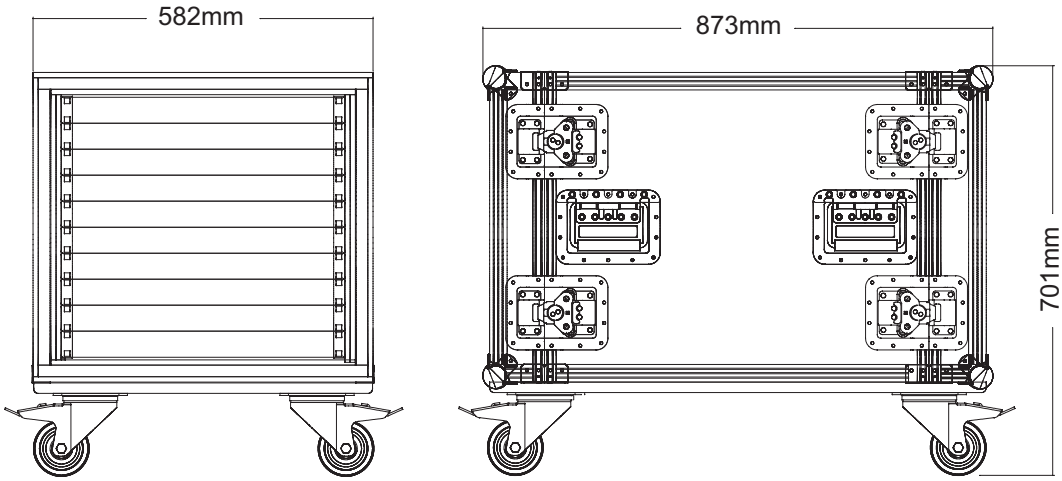
**A50_ Distro2** (32A 400V 5P in + circuit breakers + LED per phase+ 6 x cetak 16A)
To be used in racks type 2: K-6 DSP+AESOP amps

## Signal Cables

**SC_05** balanced microphone cable 0.5m length
**SC_1** balanced microphone cable 1m length
**SC_2** balanced microphone cable 2m length
**SC_5** balanced microphone cable 5m length
**SC_10** balanced microphone cable 10m length
**SC_25** balanced microphone cable 20m length

## Touring Rack: Rack-T_10U

Weight: 56kg with D-100 amps; 92kg with k-6 amps (184lbs) - 56kg with FP-10000Q
Dimensions:
HxWxD: 70.1 x 58.2 x 87.3cm




Shockproof professional touring rack
9mm birch plywood
High quality hardware
Front/Rear rack profiles (465mm)
100mm Caster wheels rated at a weight limit of 160kg each
20mm high density foam
Front and rear captive doors

## Covers

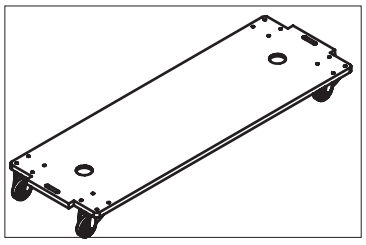
**FUN-aero50** is a protective nylon cover for 1 *aero 50*

**FUN-2-LX218C** is a protective nylon cover for a stack of 2 *LX-218C*

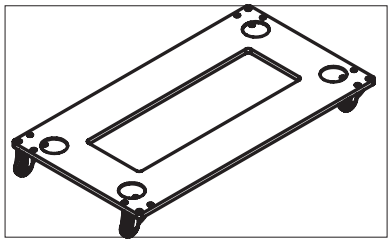
**FUN-3-LX218C** nylon cover for a stack of 3 LX-218C

## Dollies

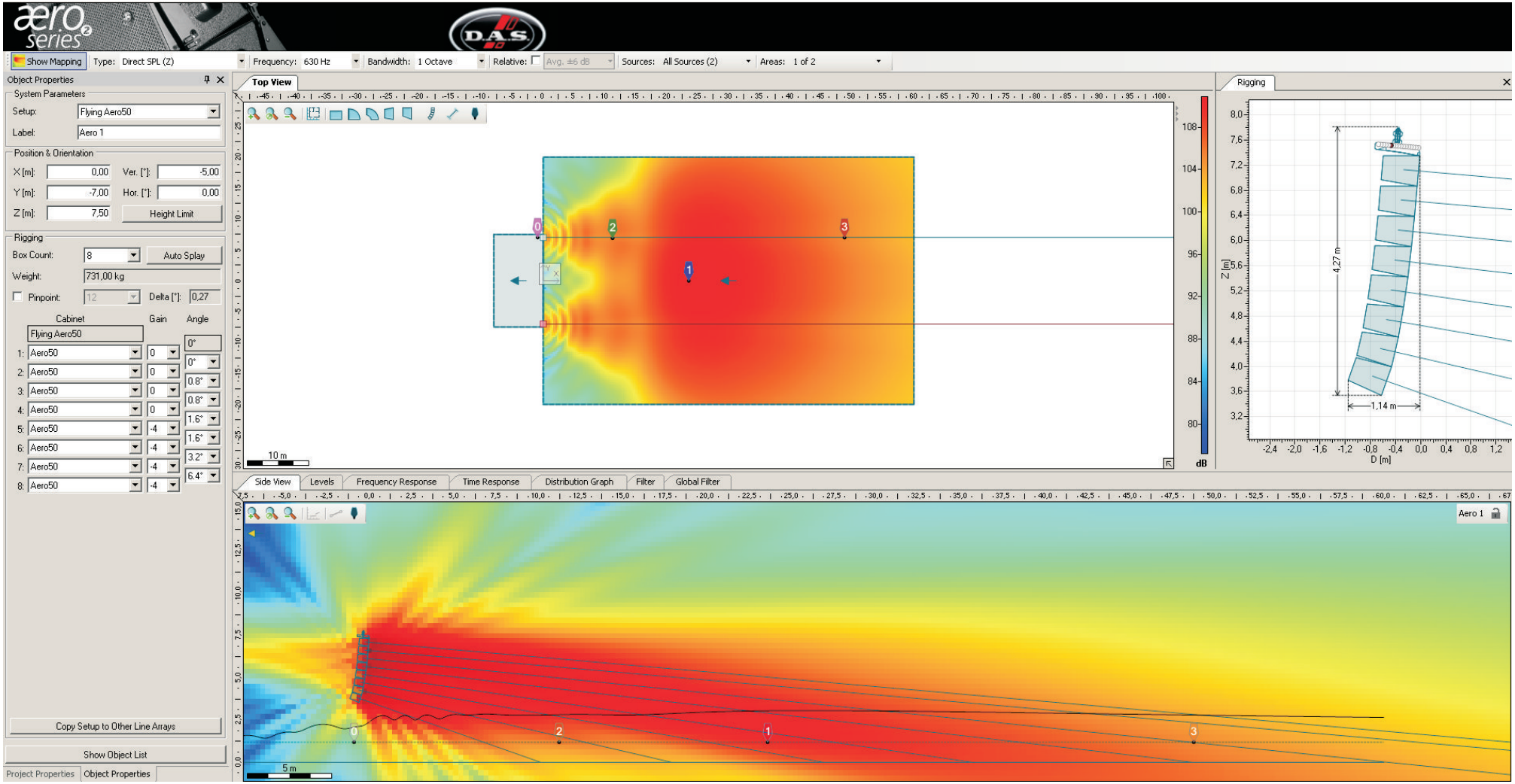
**PL-50**
The PL-50 dolly is included with each aero 50 cabinet. It is used to transport and fly the system.



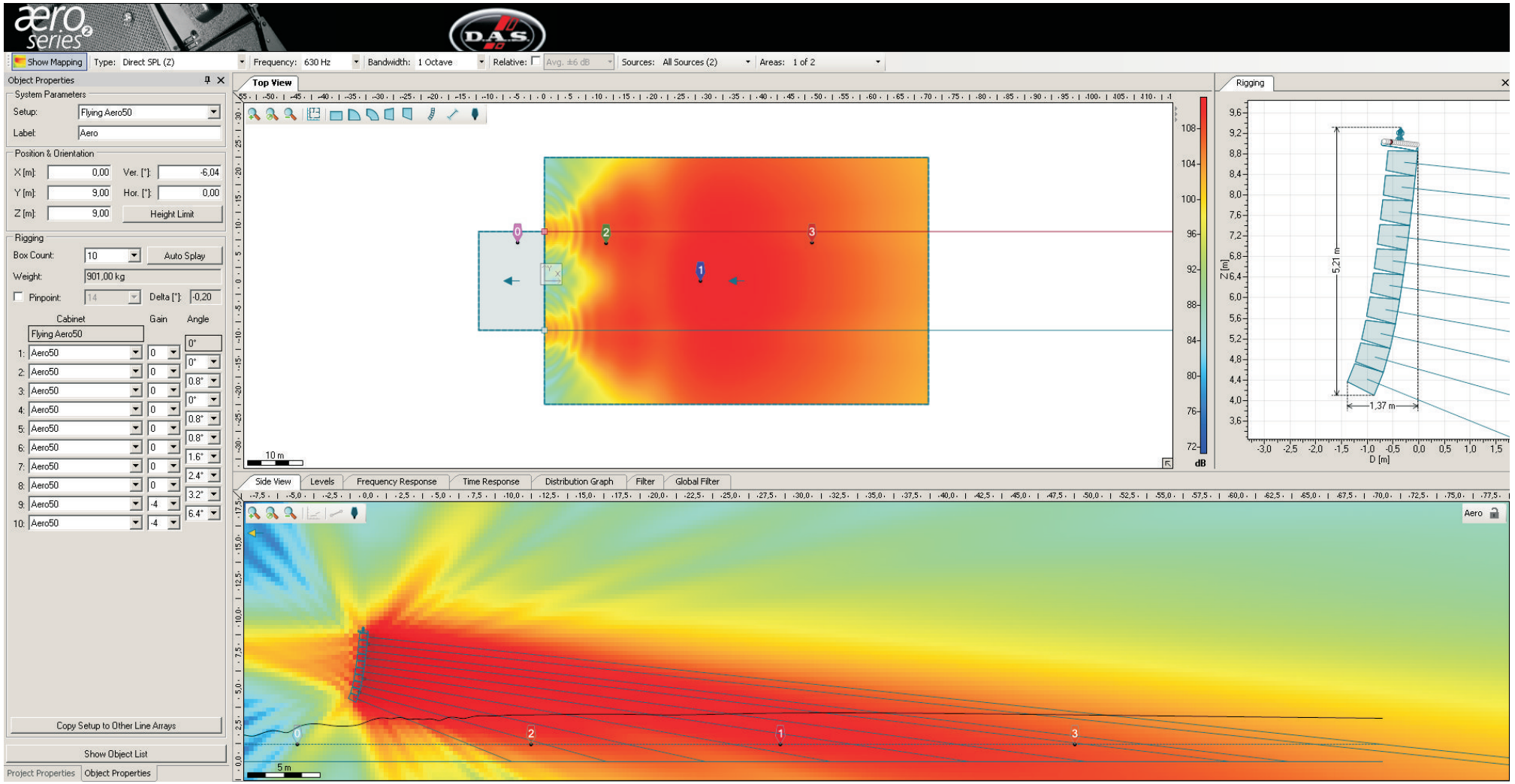
**PL-218C**
The PL-218C dolly is used to transport stacks of 2 or 3 LX-218C.



# 8 x aero 50 @ 50m; pick point height 7.7m



# 10 x aero 50 @ 60m; pick point height 9.2m



# 12 x aero 50 @ 75m; pick point height 10.2m